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Items for discussion and decision: global geographic information management

National Statistical and Geographical Institute of Brazil

Note by the Secretary-General

Summary

The report prepared by the National Statistical and Geographical Institute of Brazil describes ongoing initiatives to improve global coordination in the area of geographic information. The report argues for the need for a global spatial data infrastructure and for the better integration of statistical and geographical information. This would strengthen the analytical potential of such information and its usefulness for policy decision-making. Recent practical experience in this regard gained from the activities of the Institute are shared. The report concludes by recommending a closer active partnership between national statistical offices and national mapping agencies. The Commission is invited to encourage the United Nations Statistics Division to launch a process to facilitate the closer integration of statistical data and geographical information. Points for discussion by the Commission are contained in section VI of the report.

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Report of the National Statistical and Geographical Institute of Brazil on global geographic information management: towards better global coordination and integration with statistical information

I. Introduction

1. The rapid development of contemporary geospatial technologies, such as satellite imagery, aerial photography, global navigation satellite systems (e.g., the Global Positioning System (GPS)), hand-held computers and geographic information systems, has created unprecedented opportunities to use geographic information. The impact of these developments on official statistics is felt in particular at all stages of population and housing censuses, where efficiency has been improved in the pre-enumeration, enumeration and post-enumeration phases largely through the use of geographic information tools. These tools are also increasingly used in the context of disaster management, environmental monitoring, natural resources protection, land use, utility services and so forth, as they facilitate quick data collection and advanced data analysis and allow for a flexible and integrated approach to information-sharing and dissemination on the basis of a spatial framework.

2. It is becoming increasingly clear that the application of these technologies and the resulting geographic information management are of strategic importance. This raises two challenges: (a) how to better manage geographic information at all levels (national, regional and global); and (b) how to address the interaction and integration of geographic and statistical information.

3. The present report broadly outlines the challenges posed by the proliferation of geographic data and their integration with socio-economic and other development data, the shortcomings in the use of technical standards, the lack of legal frameworks for managing geospatial information and, in particular, the lack of global coordination. It stresses the specific issue of the integration of statistical and geographic data and shows that statistical systems gain by being integrated with geographic information systems for the building of a geospatial infrastructure in support of census and other statistical activities. The report illustrates this through the national experience of Brazil. It concludes with some recommendations that the Statistical Commission may wish to endorse with a view to both strengthening national geographic information systems and promoting the better integration of geographic and statistical information.

II. Geographic information management

4. The use of geospatial technologies has significantly increased the quantity of spatial data being collected and archived. Today we have access to imagery that, in the past, would have cost a fortune and would have required specialized, trained experts to obtain. In just a few decades, the number of geographic data users has grown exponentially worldwide, with no end in sight; the impact can easily be seen and has been widely documented in the popular press by many experts. Data volumes have drastically increased, with the integration of descriptive data (demographic, social, economic, ecological, etc.) with maps and geographic data (geographic features). The traditional function of maps has been expanded to

support contemporary uses. In many ways, mapping services have emerged as the new geographic communication vector, with hundreds of millions of users posting, consuming and comparing data collaboratively, through mashups and other map-server services.

5. With advances in information and communication technologies driving the creation of new businesses, the cartographic/geospatial information community is facing some crucial challenges: how to harness the enormous potential of geospatial technologies and go beyond local and national to regional and global applications, and how to achieve the integrated management of geospatial data sets using the Internet and multimedia in order to disseminate information required for crucial decision-making in support of social, economic and environmentally sustainable development.

6. From a national perspective, the new context, characterized by economic competition and increased demand for geographic information products, has had a significant impact on the traditional monopolies that had been established to provide a public good, leading to greater efficiency regarding the supply of and access to spatial data. This explains the need for many active players in the area of geographic information, including national mapping agencies, to consider their position in the spatial data community with a view to ensuring effective governance at the country level. In order to improve governance and economically benefit a country, a common framework for spatial data — a spatial data infrastructure (SDI) — is required which brings together data, metadata, services, users and tools that are interactively connected with a view to allowing the use of spatial data for many applications in an efficient and flexible way.

7. At the regional level, cooperation on geographic projects is emerging, as in the case of the Geocentric Reference System of the Americas, a unique geodetic reference frame that has been established for the American continent. In Europe, larger steps are being taken to develop a comprehensive spatial data infrastructure — the Infrastructure for Spatial Information in Europe. This initiative is meant to make geospatial data more readily available for policymaking across the European Community. The African Geodetic Reference Frame project was recently set up to create a unified geodetic reference frame for Africa. In Asia, similar geodetic reference work for the region (the Asia Pacific Regional Geodetic Project) has been carried out, and the Asia Pacific Spatial Data Infrastructure clearing house portal has been developed. The United Nations has long supported geographic information management in the Americas and in Asia and the Pacific through its regional cartographic conferences.

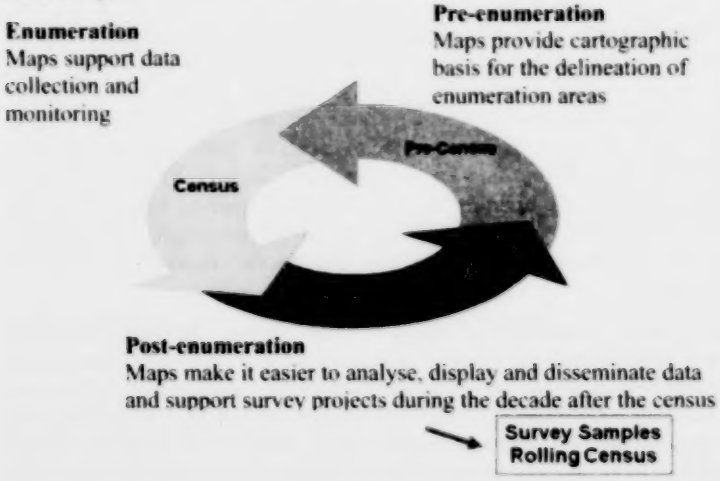
8. Given the global dimension of today's main policy changes, including population growth, climate change, disaster management, environmental monitoring and natural resources protection (ecosystems protection, water/energy resources management, weather forecasting and warning, combating desertification, environmental factors affecting human health, etc.), there is a need for better coordination and the development of integrated solutions. It is, indeed, surprising that currently there exists no global forum comparable to the United Nations Statistical Commission in which issues related to global geographic information management can be discussed. Such an intergovernmental forum would seem to be the natural place to address such coordination and governance issues, develop common tools and provide a platform where practical experiences can be shared and, thus, national capacity strengthened, especially in developing nations.

III. Integration of statistical and geographic information

9. Statistical data, including many development data, such as economic and health data, relate to human activities that can be geographically referenced. Geography is, indeed, increasingly recognized as key to virtually all national statistics, providing a structure for collecting, processing, storing and aggregating data. The integration of geographic information and statistical applications yields considerable benefits for national statistical offices, as it reduces the cost of and the time required for collecting, compiling and distributing information and leads to a greater number of services and the much wider use of statistical information, thereby considerably increasing the return on investment in data collection.

10. Mapping is one of the most critical activities of a census. The accuracy of the delineation of enumeration areas and the quality of their representation on a map have a crucial impact on the quality of the data collected. The increasing use of hand-held devices with GPS and low-cost aerial and satellite imagery for spatial data collection and the demarcation of statistical enumeration areas, as well as geographic information systems for the display of census information, have improved census mapping in fundamental ways. Geographic data are now more easily collected, disseminated, accessed and manipulated by multiple providers and users. The three main operational phases of any national statistics office can be supported by geographic information systems: the integration of field data collection; the processing of statistical data, and the dissemination of data and support for statistical surveys using maps that can be made available through the Web for wide public access (see figure I).

Figure I
Census cycle


Enumeration
Maps support data collection and monitoring
Pre-enumeration
Maps provide cartographic basis for the delineation of enumeration areas
Pre-Census
Census
Post-enumeration
Maps make it easier to analyse, display and disseminate data and support survey projects during the decade after the census
Survey Samples
Rolling Census

Source: United Nations Statistics Division.

11. The rapid integration of geospatial data with a variety of other data, including demographic and socio-economic data, and their analysis and modelling, has increased the understanding of the dynamics of socio-economic and demographic

structures and helped create more accurate, timely and unbiased information for better decision-making. For example, such integration has proved to be critical in achieving improved operational readiness and responsiveness to disasters. By using satellite imaging, scientists and demographers can compare images and statistics taken before and after earthquakes to estimate the amount of aid to be allocated to populated areas. There are many such examples related to the increased use of geospatial data in socio-economic, demographic and environmental analysis.

12. Institutional arrangements vary widely from country to country. In many cases, the collection of statistical data and the collection of spatial data, including thematic map production, are carried out by different organizations. This often results in a lack of common standards and, consequently, incompatibility of data and other quality problems, such as incomplete documentation of data. However, a close linkage between geography and statistics exists in those countries where the national statistical and mapping agencies are institutionally integrated under the same roof, this is the case in Brazil and Mexico.

13. Independent of institutional arrangements, countries are increasingly discovering that they can leverage the strengths of national statistical and mapping agencies through what is referred to as a national spatial data infrastructure,[1] an institutional arrangement to permit data-sharing and collaboration across government at a variety of levels, including the national, regional and local levels. For example, foundational data layers, such as demography and administrative boundaries, that are produced by a national statistics office can be shared among many users, eliminating the cost associated with the duplication of efforts. Those two layers are important components of any national spatial data infrastructure.

14. However, for many developing countries, spatial data infrastructure is still at an incipient stage of development. Public policies at various levels are also lacking in relation to geographic as well as statistical information for development. It is therefore critical to sensitize politicians and policymakers about the usefulness and applications of spatial data coupled with statistical data. In this respect, the United Nations Statistics Division should continue to encourage partnerships between national statistical offices and national mapping agencies and promote the concept of national spatial data infrastructure and its critical role as the foundation of regional and global spatial data infrastructure.

IV. National spatial data infrastructure in Brazil

15. In Brazil, geospatial data are largely produced, maintained and acquired by public sector organizations in all governmental spheres. Nevertheless, it remains difficult for the user to find the geospatial data sets that are available and to learn what their features are, who maintains them, and how they can be accessed. In other words, large volumes of such data exist within Brazilian governmental organizations, but it is difficult even for decision makers in the public sector to find or access them. Hence, the very first requirement for the establishment of a spatial data infrastructure in Brazil is that geospatial metadata be made fully available for

[1] A national spatial data infrastructure is a combination of the technology, policies, standards and human resources necessary to acquire, process, store, distribute and improve the utilization of geospatial data (see the GSDI Cookbook, available at www.gsdi.org/gsdicookbookindex).

the existing geospatial information assets or collections maintained by public sector organizations.

16. Presidential Decree No. 6666 of 27 November 2008 established a legal framework for the Brazilian national spatial data infrastructure enterprise, known by the acronym "INDE". The legal framework of INDE was created with a view to:

(a) Promoting the organization of the production, storage, access, sharing, dissemination and use of the geospatial data coming from governmental organizations at all levels, aimed at the country's development;

(b) Promoting the use, in the production of geospatial data by governmental organizations at all levels, of the standards and specifications approved by the National Commission of Cartography;

(c) Preventing the duplication of efforts and the waste of resources in the acquisition of geospatial data by governmental organizations through the release of corresponding metadata by those organizations.

17. According to the legal framework of INDE, all federal organizations that produce and maintain geospatial data sets and information are obligated to make their collections, including the corresponding metadata, publicly available through the Brazilian Directory of Geospatial Data. The only exception to this rule concerns classified or confidential data related to social and national security. The Directory is defined in Decree No. 6666/08 as a system of data servers distributed on the Internet in order to bring together in cyberspace producers, administrators and users of geospatial data to facilitate the storage and sharing of and access to such data and related services.

18. State and local organizations in the Brazilian public sector are not required to make their geospatial information assets or their corresponding metadata publicly available. But it is expected that they will associate themselves with the INDE enterprise voluntarily, once they realize the overall benefits that may result from their support. Another role that the private sector is expected to play concerns its capacity for creating new added-value products and services that should fit the wide variety of user profiles and demands emerging from the INDE enterprise, thanks to the increasing volume of geospatial data that will be made accessible to users in an organized way.

19. The Decree also states that any user properly identified through the Brazilian geospatial data portal — also known as "SIG Brasil" — should be able to access free of charge all digital geospatial information made available through the Brazilian Directory of Geospatial Data.

20. The National Statistical and Geographical Institute of Brazil and the National Commission of Cartography are playing important roles in building INDE. The Commission elaborated and submitted to the Ministry of Planning, Budgeting and Administration of Brazil on 27 May 2009 an action plan for INDE implementation (see http://unstats.un.org/unsd/geoinfo).

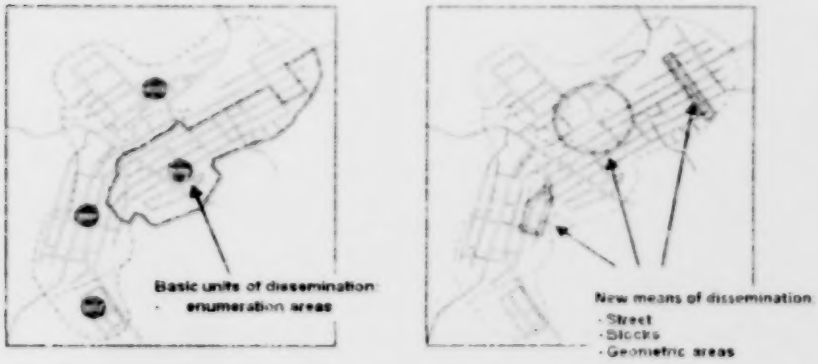
V. Brazilian practical experience of the integration of geography and statistics

21. Integrating statistical data into national spatial data infrastructure opens new horizons, given the possibility of correlating such data with all other data layers, such as those related to natural resources and the environment. The new Web-based technologies allow national statistics offices to produce census mapping in a fully digital way, integrating maps, enumeration area boundaries, graphics and text files, as well as address files. The current availability of low-cost high-resolution orbital and aerial imagery can help in updating census maps.

22. The National Statistical and Geographical Institute of Brazil has been preparing for the 2010 demographic census operation. The census maps which it will use in planning and directing its operations are being prepared with the extensive use of satellite images and will therefore constitute a rich resource in the creation of national spatial data infrastructure. Much has been done in the past to adapt internal processes so that they can absorb the new technologies available and to improve data collection, monitoring support and the dissemination of the census results. An important advance was achieved in the 2007 census, when 80,000 personal digital assistant devices were used to ensure quality control at the time of the survey and the real-time monitoring of data collection in all municipalities. This procedure allowed rural establishments (farms, schools, etc.) to be georeferenced, as personal digital assistant devices were equipped with GPS. For the 2007 census, over 70,000 maps of census enumeration areas were converted to the new SIRGAS2000 geodetic system and, for the 2010 census, it is expected that that figure will increase to 280,000 maps of census enumeration areas.

23. Another fundamental effort initiated in the context of the 2007 census operation was the preparation of a national register of addresses. For 2010, a further step is being taken, based on the linking of address records to block faces on digital census maps. This will improve data collection, allowing the 2010 census interviewers to tap on each block face on the personal digital assistant device screen so as to gain access to the addresses and corresponding questionnaires of that specific block face. This will increase data dissemination possibilities on the basis of the association of census data with different portions of the territory. Figure II illustrates these new dissemination possibilities.

Figure II
New ways of disseminating data



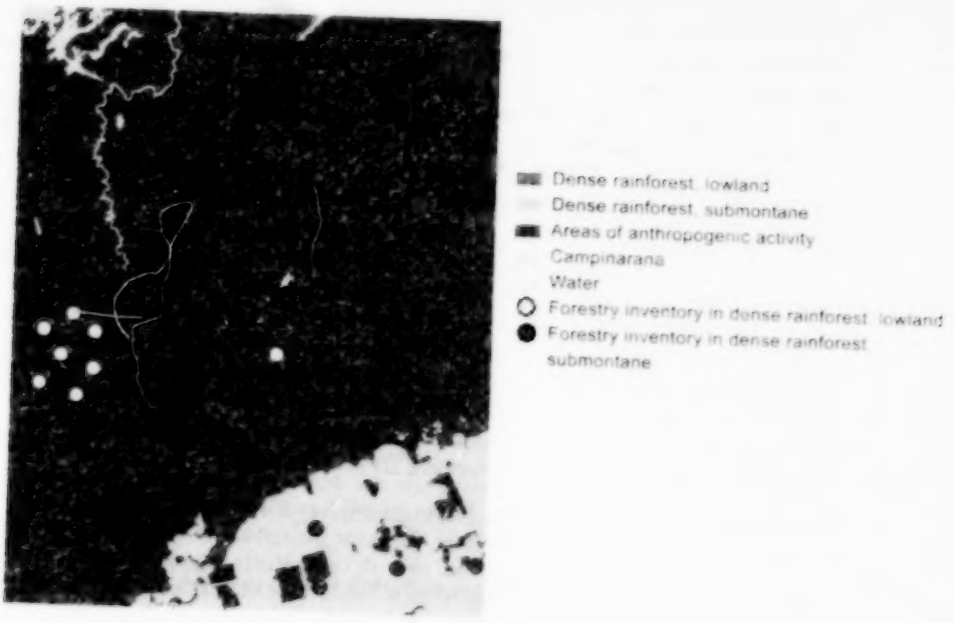
24. The National Statistical and Geographical Institute of Brazil has also developed GeoBase and SisMap software tools for census map production. GeoBase is a stand-alone piece of software used to update urban maps of municipalities with less than 20,000 inhabitants, whereas SisMap is a Web-based tool for updating maps of larger cities, integrating all data produced regarding census mapping, including the maps produced using GeoBase, and monitoring the entire production process. The production scheme involves more than 500 small offices across the country, 27 State offices to ensure quality control and the Institute headquarters, which integrates all data. It is planned that SisMap will become the main geospatial information publisher for SIG Brasil. The current focus is on census mapping, but in the next stages the focus will shift to topographic and thematic map production.

25. Another example of integrating geospatial information with statistics in Brazil is related to Amazon deforestation monitoring. Owing to its continental dimensions, it is not possible to measure the impact of human actions in the Amazon without using satellite imagery. The Brazilian Government has two permanent systems to monitor deforestation in this region — DETER and PRODES — developed by the National Institute for Space Research (see http://www.obt.inpe.br/prodes and http://www.obt.inpe.br/deter, respectively). Deforestation data can be combined with forest inventories and floristic surveys, using geographic information systems, to provide indirect estimates of the volume of wood extracted from the forest in a given area or time frame. An example of such estimates for the Amazon municipality of Tailândia between 2001 and 2006 is shown in figure III. Information provided by PRODES shows that, during this period, an area of 633 km^2 was deforested. Eight forest inventory sample sites near Tailândia with the same type of vegetation indicated a mean of 262.37 m^3/ha of wood in the area (see figure IV). By means of a simple operation, the volume of wood extracted from this municipality can be computed as more than 16 million m^3 between 2001 and 2006. Such estimates could be very useful in building forest accounts.

Figure III

Deforestation in Tailândia municipality, 2001 and 2006

Figure IV
Forest inventory sample sites near Tailândia municipality, 2001



V. Conclusions and proposals for action

26. There is an increasing recognition that geography and statistics are interconnected and that the spatial distribution of social, economic and environmental indicators guide policy decisions in the areas of, inter alia, regional development, service provision and resource planning. A case in point is the benefits derived from linking household statistics with agricultural and rural statistics expressed in the spatial dimension. The experience of Brazil has, indeed, highlighted the potential of geospatial technologies in supporting and improving census mapping operations and underscored the fact that geography is central to census activities. It has also shown that the implementation of geographic databases in support of the whole census process is facilitated when geographic and statistical activities are managed under the same institutional framework. For many other countries, national practices in building a robust basis for census geography rely on symbiotic efforts by national statistical authorities and outsourced contractors, as well as on partnerships with national geographic authorities.

27. On the basis of the information contained in the present report, Brazil would like to suggest that the Statistical Commission recommend that countries adopt this approach as an efficient paradigm: the national statistics office should actively participate, in partnership with other national authorities, in the development of a national integrated geographic and statistical information system. In other words, national statistics offices should be encouraged to approach census-related geographic information systems and mapping activities within the scope of a pan-governmental information infrastructure, with an emphasis on institutional

collaboration through the vehicle of a spatial data infrastructure. This suggests the need for clearer national recognition of cooperation between the geographic and statistical sectors as a strategic area for development. In the context of the global statistical system, the United Nations Statistics Division should continue to stress that spatial data is an important tool for strengthening national statistical systems and continue to promote ongoing collaborative efforts at the national and regional levels, in particular within national statistical offices and national mapping agencies. Its work should continue to promote the concept of national spatial data infrastructure at the country level, as well as a coherent global spatial data infrastructure at the global level through the regional cartographic conferences.

28. Underscoring the fact that these new geospatial technologies require a commitment on the part of national Governments and the mobilization of significant resources at the national level, as well as a coordinated mobilization at the regional and global levels, Brazil also recommends that the United Nations Statistical Commission call upon the Secretary-General to prepare a report on a global vision for geographic information management that goes beyond traditional cartographic activities to a flexible and integrated approach to global, regional and national geospatial and statistical information infrastructure and proposes mechanisms for better and continued coordination between all stakeholders.

29. There is a need for a global forum to address global geographic information management on a continuous basis and allow the geospatial information community to meet, interact and be updated on new developments, products and emerging trends and issues. Such a forum would be a vehicle for the exchange of information between countries and other interested parties, in particular for sharing best practices in legal instruments, management models and technical standards for the building of spatial data infrastructures, the development of the interoperability of systems and data and the establishment of mechanisms, such as Web-based geoportals, that guarantee that geographic information is easily accessible in a timely fashion. Only through initiatives and actions at the global level — work to develop common frameworks and tools and a process of standardization, for which the United Nations has a key mandate — will it be possible for countries and regions to effectively access geographic information for common purposes and for standards-based data-sharing to become the norm.

30. The regional workshops and the expert group meetings on census mapping that have been organized by the United Nations Statistics Division in the context of the 2010 World Population and Housing Census Programme emphasized the need to exchange national experiences in the area of census geography and urged the Division to continue organizing similar meetings at the international and regional levels, thereby ensuring increased technical interchange and the strengthening of national capacities. The Statistical Commission would request the Statistics Division to convene, within a year, an international expert group meeting to prepare terms of reference taking into account the following key questions: How do we establish and promote interoperability systems and services that can improve access to and the interactive use of spatial and statistical data to enhance data-sharing and support decision-making through international standards and specifications? How do we develop and promote such technical standards and specifications? What are the best practices for an informed and cohesive legal and policy framework? What will be the future Web services standards?

31. By taking these steps, the Statistical Commission would lend its professional supporting voice to similar conclusions reached by the professional community of geo-information experts. At the eighteenth United Nations Regional Cartographic Conference for Asia and the Pacific, held in Bangkok from 26 to 29 October 2009, a resolution was adopted recognizing the absence of a United Nations consultation process which is led by Member States that deals with global geographic information management, coordinates regional efforts, promotes global norms on geographic information and brings such information to bear on global issues. The resolution also recognized the requests of Member States for a global mechanism — the work to develop common frameworks and tools and a process of standardization, for which the United Nations has a key mandate — to address the need for experience exchange and technology transfer on geographic information tools and infrastructures with specialized, regional and international organizations. The resolution requested that the Secretary-General and the United Nations Secretariat initiate discussions and prepare a report for a future session of the Economic and Social Council on the global coordination of geographic information management, including consideration of the possible creation of a United Nations global forum for the exchange of information between countries and other interested parties, in particular for sharing best practices in legal and policy instruments, institutional management models, technical solutions and standards, the interoperability of systems and data and the sharing of mechanisms that guarantee that geographic information and services are accessible easily and in a timely manner.

32. **The Statistical Commission is therefore invited to:**

(a) **Recognize the importance of the integration of geographic and statistical information;**

(b) **Call on national statistics offices to actively participate, in partnership with other national authorities, in the development of a national geographic information capacity, in the context of the spatial data infrastructures;**

(c) **Call upon the Secretary-General to prepare a report on a global vision for geographic information management, including the possibility of creating a global forum;**

(d) **Request the United Nations Statistics Division to convene an international expert group meeting to address, inter alia, the issues outlined in paragraph 30 above.**

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Item 3 (k) of the provisional agenda*
Items for discussion and decision: Inventory on Global Statistical Standards

National Institute of Statistics and Geography of Mexico

Note by the Secretary-General

Summary

The present report describes a website developed by the National Institute of Statistics and Geography of Mexico (INEGI) containing an inventory of global statistical standards. The elaboration of this inventory was motivated by a requirement of the new Mexican statistical law that national methodologies be in concordance with international recommendations and standards. Mexico is offering this system to the international community and suggests that it be fully translated and loaded on the website of the United Nations Statistics Division. In addition, it is suggested that there be a process for reviewing, validating and updating the system in the future, in close collaboration with the international organizations that are responsible for maintaining the various global standards in the different subject matter areas. The Statistical Commission is invited to express its views on the report and the proposed course of actions, contained in the present report.

* E/CN.3/2010/1.

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Report of the National Institute of Statistics and Geography of Mexico on international statistical standards and the harmonization of national statistics

I. Introduction

1. The present report describes how the National Institute of Statistics and Geography of Mexico (INEGI) developed an inventory of international statistical standards as a result of an explicit requirement in the new national statistical law that the national statistical system should take international norms into account. The report argues that compliance with international standards is an important tool to harmonize and strengthen the Mexican statistical system. The many practical challenges of defining, describing and classifying international statistical standards in order that they may be included in a database are described. In addition, the idea of using the database as a benchmark to develop a tool to measure the degree of compliance with international standards is presented. The National Institute, having undertaken the considerable initial investment to create this inventory, is offering this database to the global statistical community for its use. It is suggested that it be loaded onto the website of the United Nations Statistics Division. As virtually all international statistical standards have been created and/or are being maintained by international organizations that are members of the Committee for the Coordination of Statistical Activities, it is also suggested that the Committee review the database in its current format and develop a process to improve and maintain this important inventory in the future.

II. A new legal framework

2. In April 2006, INEGI gained its technical and managerial autonomy through a constitutional amendment. Two years later, in April 2008, the new law on the national system of statistical and geographical information entered into force. The statistical law is an instrument to organize the "national system" according to the constitutional principles of access to information, transparency, objectivity and independence. The purpose of the national system is to provide the public authorities, as well as the users at large, with reliable, high-quality and relevant information in order to support national development. The data produced as part of the national system are considered to be official and must be used by the federal and state governments and by the municipal authorities. In this context, INEGI has been given normative authority and coordination responsibility for the national system.

3. In conformity with the constitutional principles, INEGI undertakes to ensure that: (a) what is conceptually defined as "information of national interest" satisfies the policy needs with respect to economic and social development of the country; (b) the information is comparable over time; and (c) the statistical and geographic processes are in line with international norms, allowing for international comparability. Under this new legal framework, the issue of international norms and recommendations has taken on special significance with respect to national statistics. The law explicitly requires that international norms, best practices and recommendations, as promulgated by international organizations, are taken into account. International standards need to be analysed and adapted to the national

context in such a way that regional and international data comparability is rendered possible.

III. International comparability of the information

4. In an increasingly globalized world with open economies and international markets, the need to have comparable official economic, social, environmental and geographic information has been frequently stressed. Today information flows freely across borders and is used in analytical processes involving foreign users and/or in the aggregation of data from other countries. Such integration of different data sources is a complicated process, however, and it can give rise to erroneous interpretations and conclusions, especially when seemingly equal data attributes have been compiled using different definitions, classifications or methods. It is precisely to avoid this situation that international organizations recommend the use of international norms and common practices to foster coherence among national statistical systems. The development of the family of international standards amounts to the development of a common language, which allows for meaningful international comparisons and dialogue, based on statistical information generated at various national levels.

5. While it is clearly a desirable objective to make national information more comparable, this requirement cannot be absolute. Not all international standards can be directly applied to a national system. There are areas where the development of national standards provides a better picture of a particular national reality. In this regard, the Mexican law requires that international standards be taken into account when creating national methods, that is, the objective of the integration of national information into the international context has to be measured and realistic, taking national circumstances into consideration.

IV. Creating an inventory of international statistical standards

6. As INEGI faced the challenge of implementing the stipulations of the new statistical law, it quickly became apparent that an inventory of all relevant international statistical standards was needed. Such an authoritative inventory does not exist at present. International organizations make international standards public and disseminate them through their print publications or through their Internet websites. Owing to the large number of statistical subject matter areas, there are a number of different international actors involved in developing standards and recommendations at the regional as well as at the global level. Consequently, international norms and recommendations are currently highly dispersed and can be found in a great variety of sources, including Internet sites, methodological print publications, legal documents, glossaries and databases. International standards are often found inside larger documents, manuals or reference frameworks, making them difficult to locate. The situation is further complicated by the fact that there is no unique definition or even descriptor of an international standard.

7. In view of the above, INEGI decided to compile its own inventory of international standards. In embarking on this task, it was necessary to ask the following questions: What constitutes an international statistical standard? Who

develops and promotes them? When and how are they being modified? How are they being used and implemented?

8. It should be emphasized that this effort to compile an inventory of international standards must be seen in the context of the overall responsibility of INEGI, which determined some of the practical decisions that had to be taken with respect to the coverage and design of the inventory. The role of INEGI as the coordinator of the national system is to take a long-term perspective and to propose working methods for the entire system. These proposed methods should be usable for all producers of national information, eliminate duplication of efforts, and thus the misuse of resources, and make discrepancies between the national methodologies and international norms clearly visible. At the working level, this means the following:

(a) To clearly identify the themes, sub-themes and variables that constitute the information of national interest;

(b) To identify the international norms (types of standards and specific versions) that are related to the information of national interest and which should be taken into consideration;

(c) To analyse the international standards that are being applied, study the possible variations that could exist at the national level and measure the degree of compliance through questionnaires distributed to the various producers of national information;

(d) To document the variations from international standards using a unique metadata model;

(e) To disseminate information on the degree of compliance with international statistical standards so that it can be used to orient and support future national statistical development.

9. Given the lack of agreement on what constitutes an international statistical norm, INEGI decided to try to include all recommendations made by international organizations, including those practices that have been adopted with considerable success by certain countries. As statistical standards are usually developed by expert groups, bringing together experts from the national statistical offices and international statistical offices, it was also decided to include recommendations by relevant expert bodies. In its present form, the inventory lists close to 800 international standards.

10. Using the definition of standards in the Statistical Data and Metadata Exchange, the standards were classified into the following five broad categories:

- Concepts and definitions
- Classifications
- Methods and processes
- Data sources
- Indicators

11. In order to be effective, standards not only have to be well developed, but also have to be updated and easily accessible by potential users. INEGI therefore started

to organize all international standards in one database, using the above five broad categories as a first organizing principle. In addition, a uniform metadata system was developed, namely a set of questions relevant to each of the standards, for example, "Who developed the standard?", "Who contributed to this development?", "When were they developed?", "With what objective?", "What other versions exist?".

12. This database, which provides access to the source of the respective international standards, is organized in accordance with the four sub-systems derived from the Mexican national system, namely: (a) economics, (b) social and demographics, (c) environment and geography, and (d) government, public security and justice. In this manner it is possible to review the content of a particular standard, together with its relevant attributes and in the context of these broad themes. The information regarding each standard is presented in one standardized technical note (see http://www.inegi.org.mx/inegi/default.aspx).

13. In order to better understand the relationship between international standards, conceptual maps or diagrams were developed to explain, in a simple manner, how international organizations and other relevant actors are related. Such information is particularly useful in areas where there are multiple reference frameworks.

14. Some of the difficulties encountered in organizing international standards are related to the fact that different subject areas are at different stages of statistical development. For instance, national accounts were conceptually developed a long time ago and they are part of a well-developed reference and analytical[1] framework; on the other hand, in the area of environment statistics, there are various reference frameworks that are being promoted by different actors. To determine whether these different reference frameworks are actually similar, complementary and/or to which degree they are using the same definitions, classifications and methods is not an easy task. As noted above, the organization of international standards is complicated by the large number of actors involved. The development of a standard is typically supported by a process of international cooperation which brings together experts from various countries, institutions and organizations. Once a standard or a group of standards have been agreed upon, it is not unusual for each participating organization to publish or disseminate information according to their own specific mechanisms and dissemination methods.[2] A typical example of this process are the many websites referring to the Millennium Development Goals.

V. Developing a measure of compliance of national statistics with respect to international standards

15. Once the information on all relevant international standards has been collected and organized for each data collection mechanism (including census, registers, surveys and monitoring methods), it will be possible to evaluate the differences and

[1] Analytical framework: a conceptual system with standardized definitions and classifications for data (Statistical Data and Metadata Exchange, 2008); see para. 10 above.

[2] Clearly, that the use of information and communications technology has facilitated the dissemination of information, which has created enormous benefits for society; however, it has also created an overload of sometimes redundant information for final users (Heylighen 2002), which does not always translate into better knowledge (Hall, 2007).

variations between the conceptual elements and methods used at the national level and the international standards that have been selected as the relevant reference frame. This amounts to the development of a measure of compliance with international standards. Having such a compliance measure would facilitate the identification of which areas future harmonization efforts should be focused. The development of such a measure is clearly a complex challenge that will require intensive analysis.

16. The measurement of compliance will be based on specialized questionnaires which will permit an analysis as to what extent an international standard has been applied. This will be done by theme, sub-theme or for related groups of variables, and will be broken down by conceptual dimension (definition, classification, calculation methods for indicators) for each data collection instrument. The results will be captured under a unified metadata model.

4. Using the inventory of standards at the global level

17. INEGI has had positive experiences with the compilation and application of the inventory of international standards. By basing the production of national information on the international norms recommended by major international organizations, the coherence and efficiency of the national system will be strengthened. The rigorous process of reviewing all subject matter areas in a systematic manner will make it possible to integrate information with common attributes so that it is comparable at all levels: state, national, regional and international.

18. The compilation of the database required a considerable initial investment, not so much in financial terms, but in human resources, as the initial design had to be discussed and reflected upon carefully. While the database, in its current form, covers all broad subject matter areas in principle, there are some sub-themes that could benefit from further technical elaboration. In addition, it should be mentioned that the elements of the system were originally elaborated in Spanish. While INEGI was able to produce a translation of all the core elements into English, it was not possible to enter all updates in both languages. Maintaining the database is also turning out to be resource intensive as statistical norms keep evolving and new fields are constantly being added.

19. For all of the reasons set out above, INEGI and the United Nations Statistics Division have discussed possible methods of cooperation. Making the inventory fully accessible to the global statistical community would have obvious benefits. A first step into this direction would be to load the current database on a special website of the Statistics Division.

20. In order to further develop the database as a useful tool for the global community, a number of tasks would have to be accomplished: (a) full translation of all parts of the database into English; (b) validation of its content with all respective custodians of international norms; (c) review of the coverage and design of the database; (d) review of the regional dimension of the database (relevant statistical norms from other regions may have to be added); (e) possible translation of the database into the other official languages of the United Nations; (f) definition of a sustainable updating mechanism.

21. Many of these tasks can and would have to be carried out in partnership with other organizations working in the statistical field. Those international organizations that are custodians of specific standards, as well as the United Nations regional commissions, would have to play an important part. As virtually all international statistical standards currently contained in the database have been created and/or are being maintained by international organizations that are members of the Committee for the Coordination of Statistical Activities, it is suggested that the Committee review the database in its current format, develop a proposal of how to improve and maintain this important inventory in the future and report back on this to the Statistical Commission at its forty-second session.

22. The Statistical Commission is therefore invited to:

(a) Discuss the merits of such a global inventory of statistical standards;

(b) Endorse the proposal that the database be posted on the website of the Statistics Division;

(c) Request the Committee for the Coordination of Statistical Activities to review the database and make proposals for its further development and maintenance.

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